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BUTTERFLY & OTHER INVERTEBRATES CLUB INC.

Aims of the organisation

- To promote the importance of invertebrates in the environment
- To hold information meetings and organise excursions around the theme of invertebrates
- To promote the conservation of the invertebrate habitat and encourage the growing of butterfly host plants
- To promote research into invertebrates
- To encourage the construction of invertebrate friendly habitats in urban areas

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Website: **boic.org.au** and BOIC on Facebook.

Membership

Annual membership fees are $35.00 printed copy and $30.00 digital PDF copy for families, individuals, schools, organisations.
Banking details are BSB: **484-799**, Account No: **001227191**, Account name: **BOIC**, Bank: **Suncorp**, Reference: your membership number and surname.

General meetings

Quarterly meetings, are held with guest speakers and to organise BOIC events.

Deadlines for publishing in *Metamorphosis Australia*

If you wish to submit an item for the publication the following deadlines apply:
1 February (March Issue), 1 August (September Issue).

All articles should be submitted directly to the Editorial Committee: info@boic.org.au.

Disclaimer

This publication seeks to be as scientifically accurate as possible. The views opinions and observations expressed are those of the authors. It is a platform for people, both amateur and professional, to share information, news and images of butterflies and other invertebrates. The submitted manuscripts are reviewed with editorial changes suggested if applicable. The editorial committee reserves the right to refuse to publish matter that it deems unsuitable for publication.

Cover image courtesy of Carol Deane,
Arkys enigma*: Dorrigo Plateau, New South Wales on *Parsonsia straminea

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Hello from the President

This December issue of *Metamorphosis Australia* is indeed a high-quality production with many excellent articles with high quality images covering a broad range of invertebrate topics. We continue the series of *Leps in Books* by Roger Kitching, this one being No. 6 in the series. Additionally, we have two book reviews, an obituary highlighting the life of Ted Edwards and several other articles on butterflies and more. This edition was postponed due to a lack of articles being submitted, but after an appeal was put out, many members came forward which has provided us with this top-notch edition. Our last meeting which we just had on the 11 November was very well attended. As usual the morning tea and refreshments were again proved by Judy and Ian Ferrier, and I would like to sincerely thank them for providing this for each meeting. Their assistance is so much appreciated. Additionally, I would like to offer a big thankyou to our secretary Dawn Franzmann, who for various reasons is retiring from the position on the 31 December 2023. She has been an instrumental part of the club for quite some time and the club wishes her well and our sincere gratefulness to her cannot be overstated.

At this point, I would like to alert members of the two inserts in this edition, the first insert outlines the new membership fee structure for 2024. This new fee structure was ratified at our general meeting held on the 12 August 2023 and it was agreed by all present that the membership fees for 2024 will be: $30.00 for a digital copy of *Metamorphosis Australia* and $35.00 for a printed copy.

The second insert is a nomination form relating to our 2024 Annual General meeting, which is being held on **Saturday 20 April** at the Mitchelton Library.

With this in mind, the news is that the three positions of vice-president, president and treasurer will be vacant, as David Exton, Tony Forster and I will not be accepting nominations for these three positions for 2024. Including the position of secretary, this will leave the club without the four key committee members. Thus, I am canvassing strongly for club members to step forward and offer themselves as nominees for these four positions. To put it frankly, unless this happens, the club may not continue to exist.

As a prelude to the BOIC AGM to be held in April 2024, the main agenda item for the **10 February 2024** General Meeting will be "**THE FUTURE OF BOIC**". This item has resulted from a reluctance of members to come forward to fill committee positions in recent years. However, I remain optimistic that a resolution will be found before the AGM.

Enjoy this edition of *Metamorphosis Australia* and the management committee hopes to hear from potential nominees for the above roles. I wish all a joyful Christmas and a prosperous New Year.

Kindest regards

Trevor

A diversity of invertebrates

Carol and Trevor Deane

On the edge of a rainforest remnant on our property on the Dorrigo Plateau New South Wales, a Common Silkpod or Monkey Rope vine, *Parsonsia straminea*, grows as a tangled thicket on a fallen tree making its leaves within easy reach. Normally, this vine scrambles high in the canopy with just a few low trailing stems.

Whilst searching (unsuccessfully!) the vine's new growth in November 2021 for eggs of the Hawk Moth, *Tetrachroa edwardsi* (Fig. 1), Trev found some strange larvae. I posted these on BOIC's Facebook page, and they were identified by Geoff Monteith as Tortoise Beetle larvae (Chrysomelidae: Cassidinae). Geoff put me in touch with Cassidinae experts which set me off on a twelve-month period (2022/23) of study involving almost daily searches of this vine following the beetle's life cycle. I also found in my searches, an astounding assortment of other invertebrate species either on or under leaves. Interesting questions are, how do the invertebrates that feed on the leaves of *P. straminea* deal with the sticky sap it exudes without the sap clogging up their mouthparts, and how do invertebrates process the pyrrolizidine alkaloids that are found in the leaves?

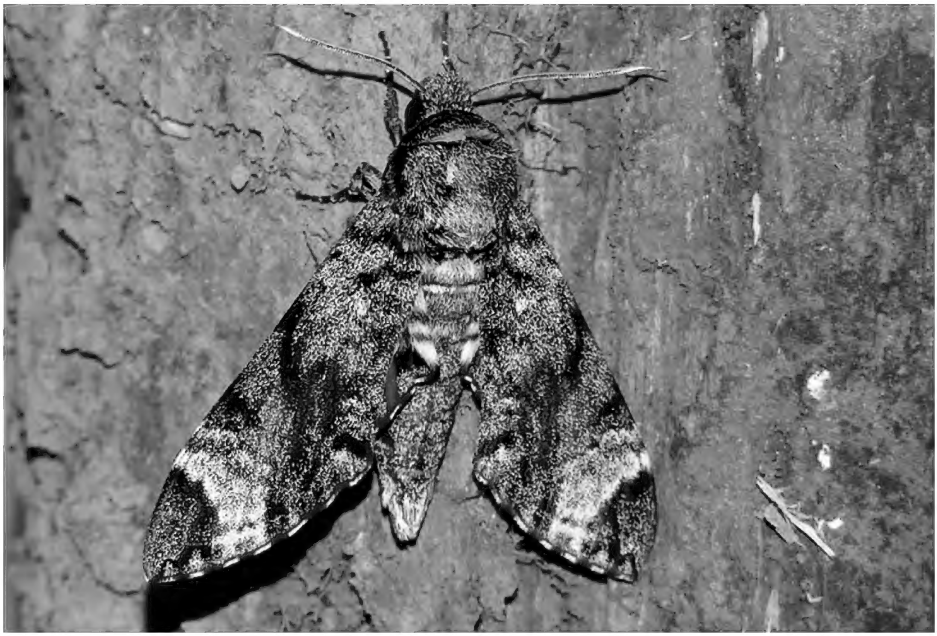


Fig. 1. Hawk Moth *Tetrachroa edwardsi*

The Tortoise Beetle was the attractive *Austropsecadia chlorina* (Fig. 2) that, in the sun, shines gold and bronze under its carapace. The strange larva piles faeces and exuviae (shed skins) to form a shield on the end of its body to hide under when threatened by predators (Fig. 3). It carries this shield, adding to it, through its five instars until pupation, leaving it on the pupal case. Both larvae and adult beetles feed on the leaves of *P. straminea.*

Other beetles found on *P. straminea* were leaf-eating beetles in the Family Coccinellidae, i.e., two ladybird species, one the striking yellow and black Tortoise-shelled Ladybird, *Harmonia testudinaria,* the other, an uncommon mycophagus (fungus eating) beetle, *Illeis flava*, plus the Pittosporum Beetle, *Lamprolina* sp. (Chrysomelidae), with its shiny dark blue wings and orange head and thorax.

I was thrilled to find among two species of katydids, the startling nymph of Naskrecki's Bush Katydid, *Ozphyllum naskreckii* (Tettigoniidae: Phaneropterinae) (Fig. 4) whose checkered green and black matched so well the old spotty leaf it was sitting under. They are nocturnal and eat leaves and insects so it may have been feeding on the many tortoise beetle larvae. Additionally, there were an astonishing sixteen species of spiders recorded on the vine, including a very rare Turret Spider, *Arkys enigma* (Fig. 5), previously only recorded from Tasmania. That was a very exciting discovery! The spiders too were preying on beetle larvae.

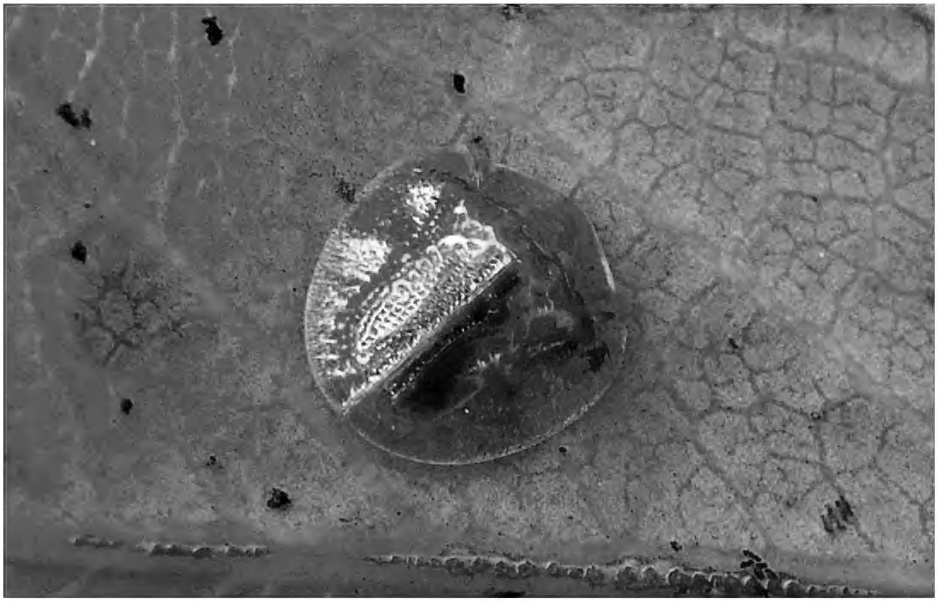


Fig. 2. Tortoise Beetle *Austropsecadia chlorina*

Fig. 3. Tortoise Beetle larva *Austropsecadia chlorina*

Fig. 4. Naskrecki's Bush Katydid *Ozphyllum naskreckii*

Fig. 5. Turret Spider *Arkys enigma*

Other observations were: an unidentified cockroach (perhaps Ectobiidae: Pseudophyllodromiinae) (Fig. 6) and a white cockroach nymph (Fig. 7); a plant hopper *Saccharodite chrysonoe* (Derbidae: Otiocerinae), plus eggs which duly hatched into pale yellow nymphs; tree hopper adults and nymphs (Membracidae: Centrotinae); spittle bugs (Family Aphrophoridae) with their bundles of white foam; a Granulated Stick Insect, *Candovia granulosa* (Diapheromeridae: Necrosciinae); a woodlouse (Family Armadillidae); many tropical Beehive Snails *Coneuplecta calculosa* (Family Euconulidae) that graze on biofilm growing on the leaf surface; the long dangly-legged Common Brown Crane Fly, *Leptotarsus costalis* (Tipulidae: Tipulinae) (Fig. 8) whose larvae are either aquatic or live in damp soil.

The only caterpillars on the vine were a Black and White Tiger Moth *Ardices glatignyi*, a Common Anthelid, *Anthela acuta* (the adults of these two moths often come to our light), an early instar Geometrid looper, plus a cute little log cabin type case moth (Family Psychidae) (Fig. 9).

We were disappointed not to find eggs of *T. edwardsi.* Between October and January, we have several adult moths of this species, often newly hatched, come to our light and know they must be laying somewhere on the property. We can only assume it is high in the canopy way beyond our reach.

It was always exciting to turn over a leaf and find something we hadn't seen before hiding there and heartening to see such diversity on one plant.

Fig. 6. Cockroach

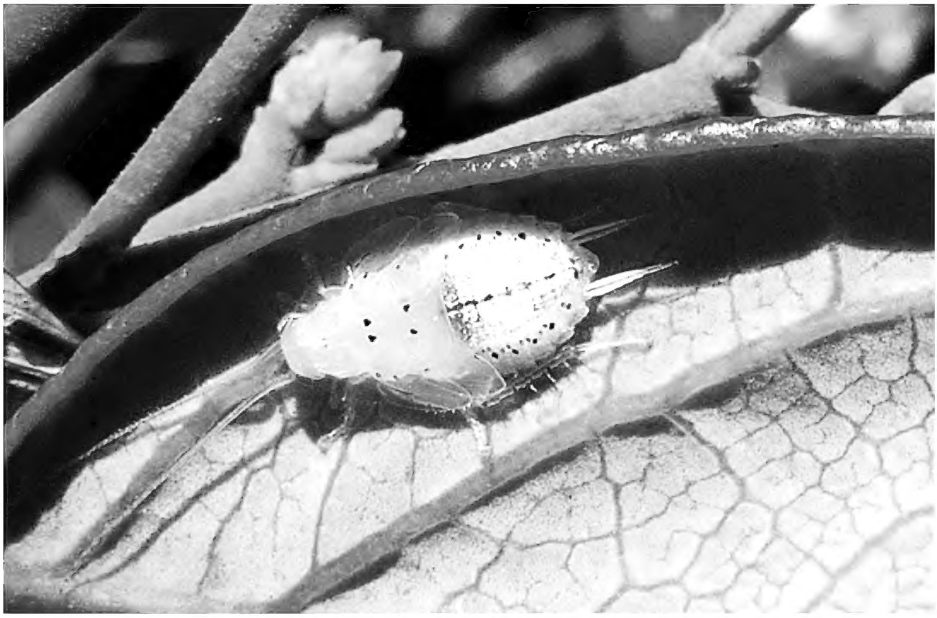


Fig. 7. Cockroach nymph

Fig. 8. Common Brown Crane Fly

Fig. 9. Case moth

Life history notes on the Narrow-winged Iris-skipper *Mesodina hayi* E.D. Edwards & A.J. Graham (Lepidoptera: Hesperiidae: Trapezitinae) from Western Australia

Stephen Brown, Cliff Meyer and Richard Weir

Introduction

The Narrow-winged Iris-skipper, *Mesodina hayi* E.D. Edwards and A.J. Graham is endemic to Australia where it is only known from two disjunct areas in south-west Western Australia: a restricted site near Quairading, 160 km east of Perth, and an area further north-west bounded by 34 km south of Billabong Roadhouse, 56 km north of the Murchison River and the Kalbarri National Park (Braby 2000). The butterfly was first collected at the Quairading site by A.J. Graham in October 1987 with further specimens being collected by E.D. Edwards and E.S. Nielsen in November 1994 which led to the butterfly's description (Edwards and Graham 1995).

In October 1994, a number of mature larvae and pupae were collected from *Patersonia drummondii* F.Muell. ex Benth. (Iridaceae) plants and reared to adults with Williams and Atkins (1997) describing the life history, including beautiful and detailed illustrations by Andrew Atkins. In September 1995, *M. hayi* was discovered on a larger form of *P. drummondii* growing alongside the Northwest Coastal Highway, 56 km north of the Murchison River Bridge and at Kalbarri National Park. *Mesodina cyanophracta* Lower was also recorded near Kalbarri with larvae of this butterfly found feeding on isolated clumps of *P. occidentalis* within 10 m of *M. hayi* larvae on *P. drummondii* (Williams and Atkins 1996). Thus, confirming that the two species were sympatric at this location.

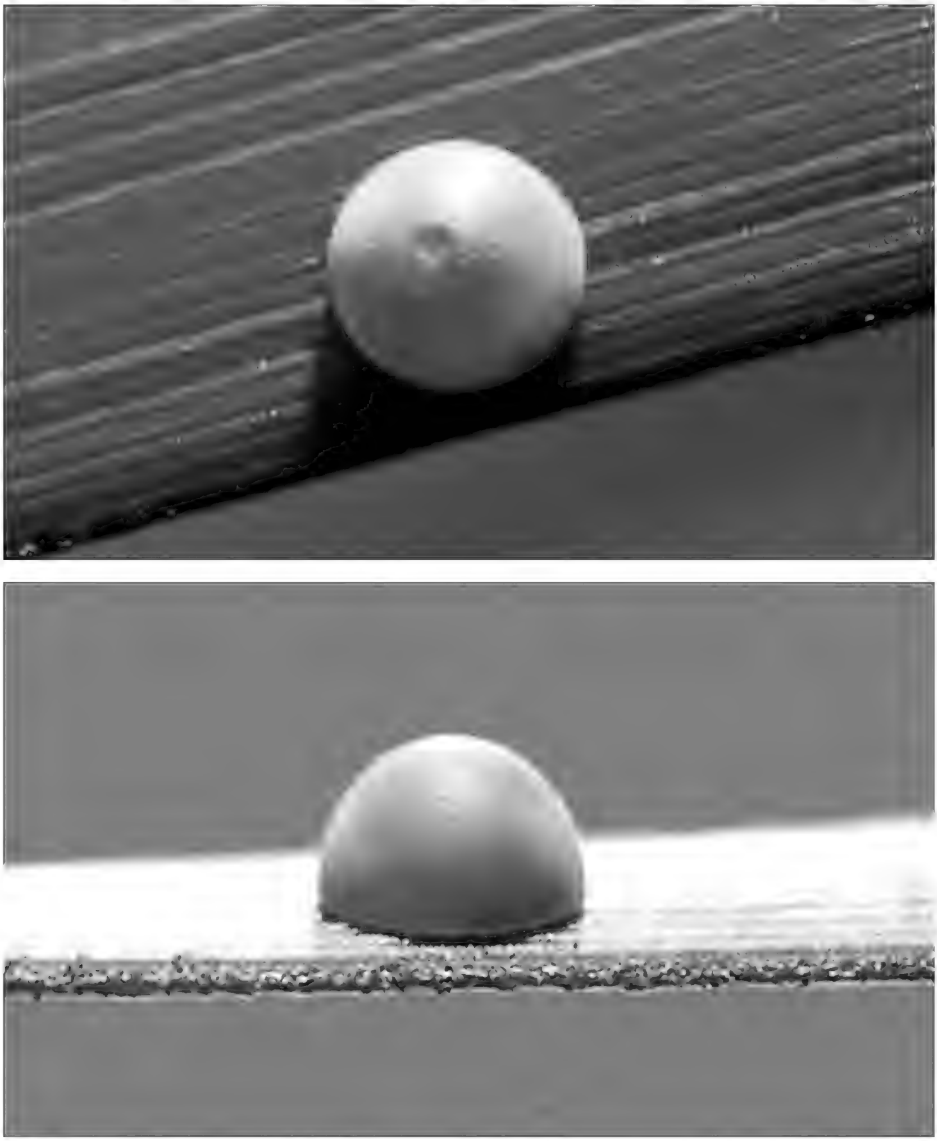
On 8 October 2008, we ventured north of Kalbarri in search of this skipper to a site 53 km north of the Galena Bridge over the Murchison River on the Northwest Coastal Highway (27.370°S, 114.638°E). When we arrived, it was mid-morning and was already a very hot 35°C day with very bright sunshine. It was so bright that it was the only time that we could remember the need to wear sunglasses to collect, due to the reflected sunlight coming off the sand.

Observations and discussion

We found that adults were abundant at this location (Fig. 1) and at other sites nearby. The food plant, *P. drummondii* (Fig. 2) was also very common and we found numerous larval shelters and all immature stages. The adults were flying very rapidly within a metre of the ground. Males established leking territories settling often on logs, sticks, low branches, and small sand hills up to 30–50 cm high.

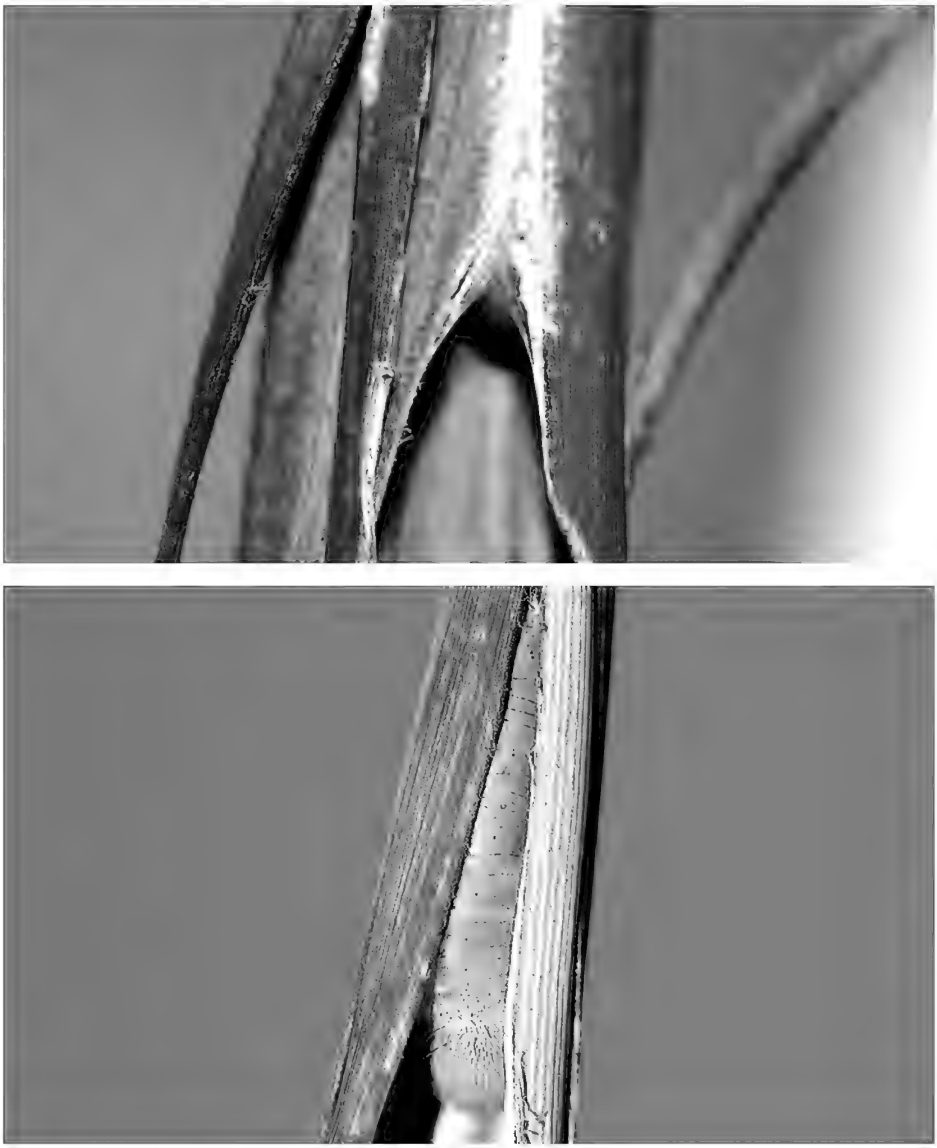
Figs 1, 2. Habitat and food plant, 53 km north of the Galena Bridge over the Murchison River on the North West Coastal Highway, Western Australia: 1. habitat; 2. food plant *Patersonia drummondii*

Females were generally encountered off to the side of the main leking areas, often in the shade, and were not as active as the males. The adults did not appear to be impacted by the heat and continued to fly during the heat of the day. Eggs (Figs 3, 4) were laid singly on the under surface of the leaf.



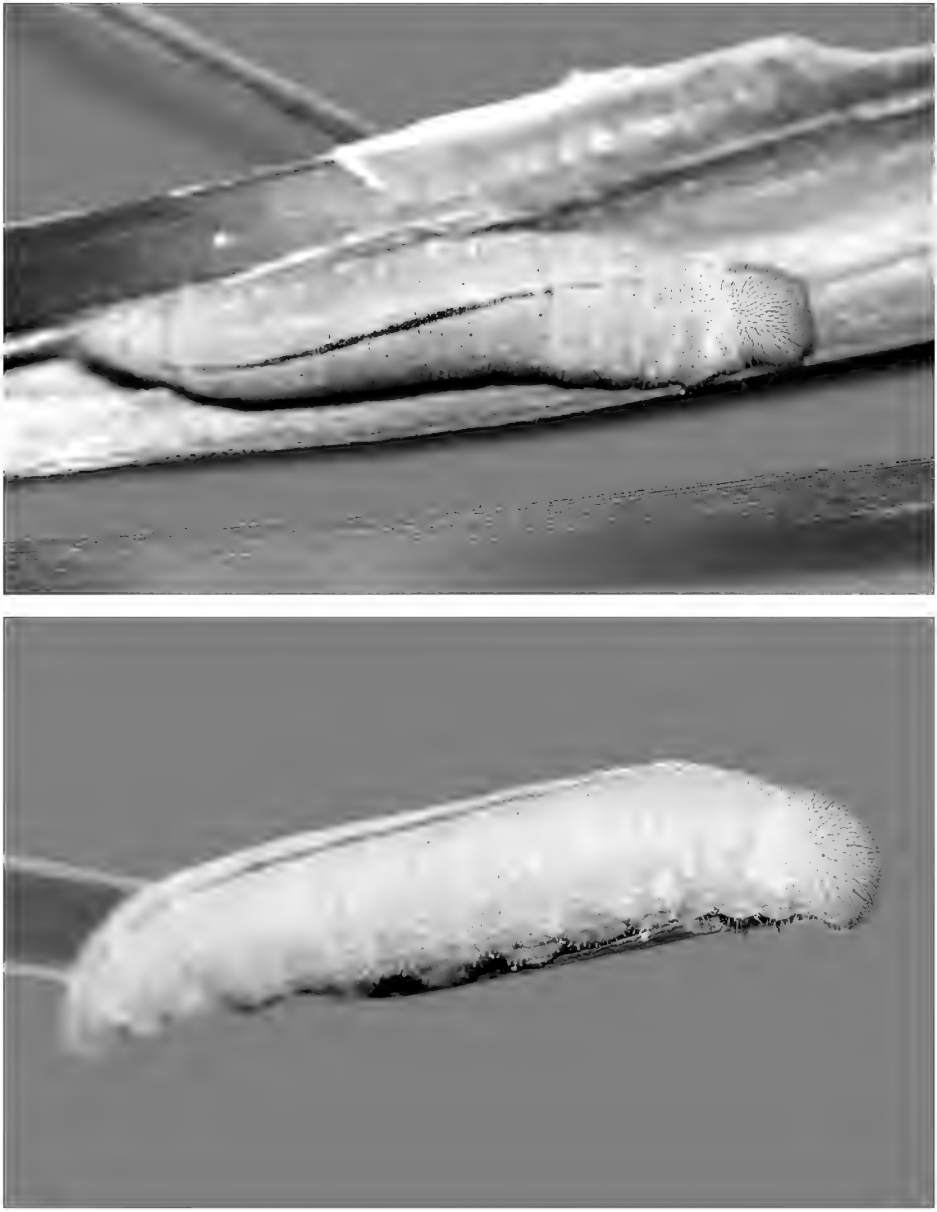
Figs 3, 4. *Mesodina hayi* egg: 3. dorsal view; 4. lateral view

The larvae produced shelters by silking several leaves together (Figs 5, 6) forming vertical tent-like shelters in which the larvae orientated themselves head downwards within the shelter.



Figs 5, 6. *Mesodina hayi* final instar larval shelter. 5. larval shelter; 6. shelter opened to show larval orientation

Williams and Atkins (1997) described and illustrated the mature larvae (Figs 7, 8) in detail.



Figs 7, 8. *Mesodina hayi* final instar larva. 7. dorsal view; 8. lateral view

The pupae (Figs 9, 10) were also orientated head down within the shelter with the opening closed over with fine silk prior to pupation.

Figs 9, 10. *Mesodina hayi* pupa: 9. in shelter; 10. lateral view

A freshly emerged adult male and female are illustrated in Figs 11 and 12, respectively.

Figs 11, 12. *Mesodina hayi* freshly emerged adults. 11. male; 12. female

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Trapezites eliena (Hewitson) cops a hammering in February 2022

Mark M. Hunting

The late summer and autumn of 2022 were noteworthy in southeastern Queensland and northern New South Wales for intense storm and wet weather events that triggered record insurance claims for property damage because of these extreme events. The average annual rainfall in Logan, on the south side of Brisbane, is usually in the order of 1100 mm. However, three storm events, between late February and mid-May 2022 dumped 655 mm, 135 mm, and 230 mm, as recorded in my rain gauge in Logan. That's almost the average annual rainfall in just three months. During this time the local rivers and streams overflowed and there was little opportunity for recovery of wetlands and their environs between these events. Moreover, at the Slacks Creek Environmental Park, which is a reserve beside Loganlea Road and is wedged between Slacks Creek from the north and Scrubby Creek to the west, it is not uncommon for flooding to occur over the adjacent grasslands, and even Loganlea Road itself during times of heavy rainfall. But during the autumn of 2022, inundation occurred for an extended period.

On 7 October 2021 and again on 17 January 2022, *Trapezites eliena* had been observed in the *Lomandra* grasslands of the Slacks Creek Environmental Park. But alas, upon visiting the site again after the floods on 13 October 2022, *T. eliena* was nowhere to be seen, even though the *Lomandra* were flourishing. Thus, it is presumed that the early larval stages of the butterfly on *Lomandra* could not withstand the prolonged submergence.

It will be interesting to see over the coming seasons whether the butterfly will recolonise this habitat from nearby areas, which may not have been as adversely affected by the extreme weather events of 2022. Perhaps a consolation prize on 13 October 2022 was the capture of a male *Heteronympha merope* (Fabricius) from the park. This was noteworthy, as I have not seen this species previously in the Logan district.

The Lepidopterists' Lepidopterist: *In Memoriam* Ted Edwards (1945–2023)

Roger Kitching

Edward David Edwards AM, known universally as Ted, passed away on August 7th 2023: *vale* Ted.

It is probably fair to say that no-one, living or dead, knew more about Australian Lepidoptera than Ted. He worked within the Australian National Insect Collection (ANIC) for over 50 years, first as assistant ('Experimental Officer') to a sequence of curators of the Lepidoptera – Ian Common, Ebbe Nielson, Marianne Horak – later, after formal retirement in 2001, as a CSIRO Honorary Fellow. Ted, though, was far more than an 'assistant'. While the distinguished curators focussed on sorting out key families, writing global overviews or driving international taxonomic change (see, for example, Common 1990, Nielsen & Kristensen 1989, Horak 2006), Ted familiarised himself with the breadth and minutiae of the ever-burgeoning ANIC collection of Lepidoptera. Ultimately, he was the one (perhaps the only one?) who could look at virtually any, newly arrived anomalous moth, stalk the precipitous stacks of cabinets, pull out a drawer and tell you 'it's in here somewhere'. Alternatively, he would peer at your tentatively named specimen, shake his head, and skip to some quite different family, then point at a particular unit tray so you realized you had, once again, been misled by that noctuid-looking geometrid, or geometrid-looking noctuid (or whatever). And this help was done (almost) always with good humour and a wry smile.

This is not to say, though, that Ted's only contribution was as willing helpmeet to others. Ted was a meticulous nomenclaturist and bibliographer. His best known and most used contribution is undoubtedly the many sections of the Australian Lepidoptera checklist (Nielsen, Edwards & Rangsi, 1996) for which he was responsible – the *Checklist* is perhaps the most widely consulted of any publication on the Australian Lepidoptera. For me though, it is his more narrowly focussed treatment of the butterflies alone, published as part of the *Zoological Catalogue of Australia* by the Australian Biological Resources Survey (ABRS)

(Edwards, Newland & Regan 2001) that is a true masterpiece of detail, reliability and completeness. This work untangles the early history of butterfly taxonomy in Australia as well as the sometimes tortuous paths the subject has followed since those early days. Thank goodness that work appeared in well-bound, hard copy before the ABRS (along with many others) made the misguided decision that aether-based electronic publication alone would satisfy future scholars.

Ted did make excursions into more traditional taxonomy as well, describing new species of lycaenids, hesperiids, hepialids and castniids (for a few, but by no means all, examples see Edwards 1979, Edwards & Common 1978; Edwards & Green 2011; Kallies *et al.* 2016), commenting on moth morphology (Edwards 2022), even co-authoring the description of a new family of Australian moths (Kristensen *et al.* 2015). For the amateur lepidopterists, however, perhaps Ted's best known contributions are as co-author in general guidebooks most notably with Paul Zborowski in *A Guide to Australian Moths* (Zborowski & Edwards, 2007) and with Glenn Cocking and Suzi Bond, in *Moths in the A.C.T.* (Cocking *et al.*, 2022). Ted also played a role in several of the excellent *Moths of Victoria* series lead by Peter Marriott (Marriott *et al.* 2017; Hewish *et al.* 2014, 2016). Future bibliographers and taxonomists should note that, although Ted's earlier works appear under the authorship, 'Edwards, E. D.', several of his later works appears as 'Edwards, T.' – so, credit where credit is due, these are synonyms! As I said in my spoken comments at Ted's Memorial back in August 2023, however, the true breadth of Ted's influence is best seen in the Acknowledgments sections of virtually every publication on Australian Lepidoptera over the last many years. They all acknowledge, often humbly, the key role played by Ted in accessing, not only the riches of the ANIC, but also the true riches of his encyclopaedic knowledge of the Australian fauna and his willingness to share this knowledge with all and sundry.

Which brings me, perhaps less than obviously, to a couple of personal stories of my own collaborations with Ted.

I arrived in Australia in 1971, a keen student of the butterflies (among other things) but with no knowledge of the Australian fauna or how to encounter it. Past experience in the highly modified landscapes of the UK or the coniferous forests and alpine meadows of British Colombia were poor guides to the sclerophyll forests and heaths of the Australian bush (rainforests came later). As a research scientist in CSIRO's Division of Entomology I soon made the acquaintance of Ian Common and, through him, of the then recently appointed, Ted Edwards. As an avid student of the butterflies my immediate professional task was to 'learn' the Australian butterfly fauna (as well as the rest of the Insecta, the birds, the. mammals and plants).

Ted immediately took me in hand and over many lunchtimes and. 'stolen' afternoons taken on the top of Black Mountain (no Telecom tower then) or farther afield on the undeveloped slopes of Mt Tuggeranong or in the fastnesses of the Brindabellas he taught me how to know the Australian butterflies. With Ted I made acquaintance of the *Ogyris* blues, the elusive species of *Acrodipsas,* and the wonderful, mistletoe-feeding, *Delias.* This led to our first genuine collaboration – *The Butterflies of the Australian Capital Territory* (Kitching *et al.* 1978) recording the 79 species then known from the Territory. This article, it turned out, was regarded by other enthusiasts as a challenge and it became a focus of their activities to better (that is, add to) that list. In the long term this led to Suzi Bond's great book on the butterflies of the territory (Bond 2016) and, even more recently, an ever-growing list, now 92 species, for that bit of Australia (Bond & Vardon 2022).

One of Ted's other passions which, as readers of *Metamorphosis* know only too well, I share in full measure, was that of bibliophily. He was a voracious collector and reader of books, especially but not exclusively on the Lepidoptera: indeed, it was as 'Uncle Wattleberry' that he contributed book notes to the regular newsletter of the Moths and Butterfly Association. In 2019, as a COVID lockdown activity, I began work on a 'complete' annotated bibliography of books on Australian moths. As one does, I circulated a draft of this work to a number of lepidopterists including Ted. I received encouragement to pursue the project from all but, from Ted, in addition, I received a long list of additions and corrections revealing a depth of scholarship in the field, in many areas well beyond my own. In particular, Ted knew every nuance of the rediscovery of the ground-breaking work of the Scott sisters and their nineteenth century contributions to discovery and illustrations of the Australian moths. In due course the bibliography appeared in print but, of course, now with Ted as a distinguished co-author (Kitching & Edwards 2020).

Ted received several well deserved Honours. *A Guide to Moths of Australia* received a Whitley Award in 2007, he was made a member of the Order of Australia in 2012, and, most significant of all, he was awarded the Karl Jordan medal of the international Lepidopterists' Society in 2015. This last is the most distinguished of awards in the gift of the international community of lepidopterists and is much coveted.

Ted is survived by his wife Muriel and children Robert and Nony.

We shall not see his like again!

Acknowledgements

I thank Dr Michael Braby for providing information and Dr Beverley Kitching for proof-reading this article.

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Leps in books 6: … And then there are the lepidopterists themselves

Roger Kitching

A small section of my Lepidoptera library – perhaps a dozen books all told – deals not with butterflies and moths themselves, but with the arcane histories of the professional and amateur 'world' of Lepidoptera and lepidopterists. Several focus, in particular, on those who have dedicated their lives to the study of these insects. The authors of these often sensationalist volumes range from 'investigative' journalists to hagiographers to 'mere' memorialists. Their themes are, as we shall see, varied but almost all stress the perceived eccentricity of their subjects – the lepidopterists.

Of course, some lepidopterists *are* eccentric. Setting aside the naming and shaming by sales-seeking authors (for the moment) let me dip into my own first-hand recollections to illustrate this generalisation.

As an undergraduate entomologist at Imperial College, London, I regularly attended the monthly meetings of the Royal Entomological Society of London whose then headquarters were in Queens Gate, South Kensington – a mere block away from the College. Many distinguished entomologists attended those meetings, but none were more memorable than the Baron Charles de Worms (1903–1979) (Fig. 1). The Baron, as we students called him, was in fact a distinguished organic chemist who researched the causes of cancer at one of the London hospitals. His weakness and strength, however, was as a collector and student of butterflies and moths. I remember him as a rather portly middle-aged gentleman in a three piece suit that was more a history of his recent meals than a mark of sartorial elegance. Years later I became friends with a British entomologist who lived in Malaysia. He recounted a memorable evening when he had entertained the Baron, visiting to collect the local fauna as elsewhere. Impressed by the Baron's (albeit Austro-Hungarian) nobility my friend also invited the British High Commissioner of the day, and his lady, to dine with his distinguished visitor. Dessert was the speciality of my friend's cook – a large and cream-rich

Fig. 1. Baron Charles de Worms

English trifle. The Baron, known for his healthy appetite, took an exceptionally large helping over which, without warning, he sneezed. Madame the High Commissioner's wife received gobbets of the trifle over her low-cut evening dress while the Baron, without pause, continued with his anecdotes of collecting around the World.

We saw the Baron as a buffoon but, in fact, he was an influential scientist in his day and was known for the assistance he gave readily to others.

After Imperial College I proceeded to the University of Oxford for postgraduate studies. There I encountered yet more distinguished scientists, none more so than Dame Miriam Rothschild FRS (1908–2005) (Fig. 2) A self-taught scientist, niece of Walter Rothschild, the eminent Victorian collector, expert on the Papilionidae, and patron of Alfred Russel Wallace and many others. At various times in her career, Miriam was an expert in the taxonomy of fleas, and, latterly, what we now call a chemical ecologist. In this arena she pioneered work on the role of chemicals in moderating the interactions between butterflies and moths and their various predators. Miriam was a friend of my doctoral supervisor and a frequent visitor to the Institute in which I worked. Two events stick in my memory.

Fig. 2. Dame Miriam Rothschild FRS

The first was reported at coffee time one morning when someone remarked that we might expect to see Miriam later in the day because she had been seen parking her very large Bentley in the centre of Oxford reportedly 'by sound' rather than sight. I later attended a much more formal lecture, again at the RES in London, given by Dame Miriam, in which she was describing the cross-species impacts of 'protective' chemicals. She described how a group of French *poilus* – newly recruited soldiers – had lit upon a particularly fine crop of edible snails close to one of their campsites. According to Miriam, being French, they gathered up this bounty and had an excellent meal of *escargots.* What they did not know was that these particular snails had just enjoyed grazing upon digitalin-rich foxgloves and one of the side effects of their impromptu meal was (Miriam boomed out to the crowded lecture theatre) 'persistent and painful erections'. We later received the printed version of the lecture in the Society's *Proceedings* but alas this was an expurgated version lacking the memorable anecdote.

These two rather kindly examples establish eccentricity: other cases have not been received in such a benign and amusing fashion. The Australian lepidopterist Bernard d'Abrera (1940–2017) (Fig. 3) is known for his sumptuous tomes on the butterflies (and some moths) of the World. D'Abrera, though, was a fundamentalist Catholic who, publicly and in print, not only rejected Darwinian evolution but ridiculed those (that is the overwhelming majority of practising biologists) who accepted those ideas. He was also known for his rather cavalier approach to species description, his total rejection of any form of peer review, and was, for example, banned from accessing the Australian National Insect Collection. Nevertheless, as his long-time critic and nemesis, John Tennent, points out, his contribution in the form of his photographic catalogues of the butterflies of the world are indispensable and many of us have, perhaps reluctantly, at least some of his many works on our shelves (Tennent 2017). Another harsh critic and distinguished entomologist, Arthur Shapiro, describes d'Abrera's work and comments as not just non-scientific but actively anti-scientific (Shapiro 1991).

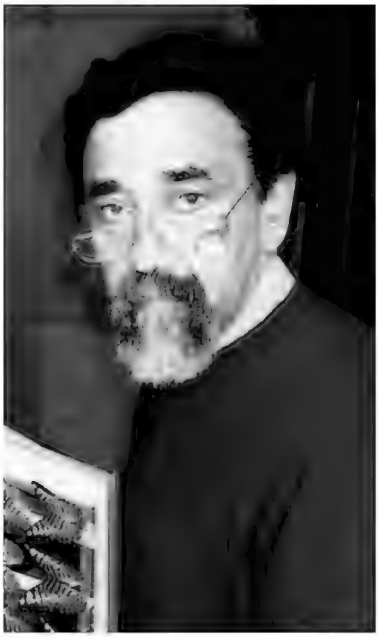

Fig. 3. Bernard d'Abrera

So, undoubtedly. eccentricity. Is to be found among the lepidopterists. Let us return to just a few of the books which have dwelt upon this.

First are the hagiographies: that is, those which praise, even adulate, particular lepidopterists. One of my favourites is the slim volume *Painted Wings* (Fig. 4). This beautifully produced book reproduces the many delicate watercolours of British butterflies and moths produced by amateur lepidopterist, George Higgs (1922–2012), often as Christmas or other greeting cards sent to his friends over a long lifetime. The reproductions are accompanied by brief essays memorialising the man and short poems extracted from *The Shepherd's Calendar* by John Clare. The overall impression is of a dedicated, pleasant man beloved of his friends. The fact that they have gone to such lengths to produce the memorial volume speaks volumes: no-one could ask for more.

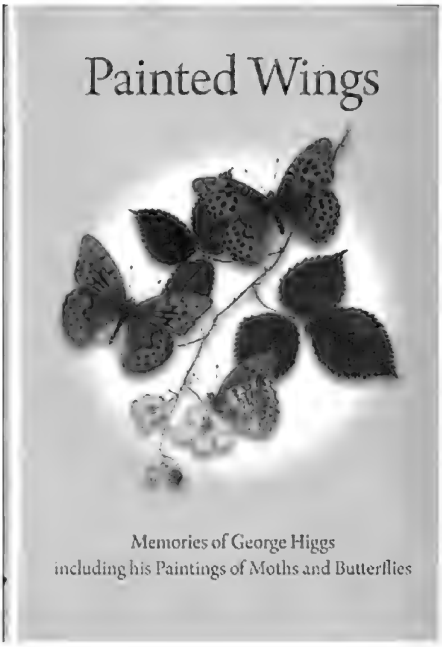

Fig. 4. *Painted Wings*

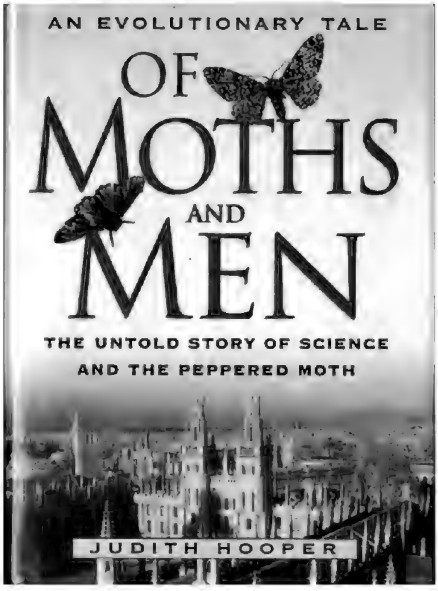

Fig. 5. *Of Moths and Men*

The second volume I wish to focus on here is far from hagiographic; indeed, it sets out, not entirely successfully, to undermine reputations. Science journalist, Judith Hooper, produced *Of Moths and Men* in 2002 (Fig. 5). In this volume she tells the story of the classic work on the English peppered moth (*Biston betularia*). In every basic textbook on evolution, we find this work on the relative survival of dark and light forms of this common English moth against polluted

(dark) and unpolluted (light, lichen-covered) tree bark, described. The suggestion is that when they more or less match their backgrounds these adult moths are less likely to be predated upon by birds because of the moths' relative visibility. This is widely presented as THE example of evoluition by natural selection. The underlying experimental work was originally carried out by an English naturalist, Bernard Kettlewell (1907–1979), acting as research assistant to Oxford professor, E. B. Ford. Now there are endless tales told about E. B. 'Henry' Ford (1901–1988) who I also knew slightly in my Oxford days (although I doubt the 'knowing' was reciprocated). Most commonly he is pictured as misogynistic (except with respect to Miriam Rothschild who, he claimed, 'had the brain of a man'). Other commonly used descriptors are 'foppish', 'egocentric' and 'manipulative' although undoubtedly brilliant. He founded the field which has become known as ecological genetics and authored what some consider the best general book on butterflies ever written – the New Naturalist volume No. 1, *Butterflies* (Ford 1945). Kettlewell trained as a medical doctor and is widely acknowledged to have been a first-class field worker if, himself, a touch eccentric – but a trained experimental scientist, he was not. Hooper's book suggests that, manipulated by Ford, Kettlewell fudged his experimental results to obtain the ratios of dark:light moths that the environmental selection idea demanded (that is: better survival of light coloured moths in unpolluted environments, and of melanic moths in polluted situations). Now, all modern critiques suggest that the experimental methods used by Kettlewell were far from perfect but there is not a skerrick of evidence suggesting that the results were in fact fudged or, in general, wrong. Later work by others (notably by the late Michael Majerus, published by Cook *et al.* in 2012) showed the selection effect was real and the original experimental results, valid. Yet later work has uncovered the genetic underpinnings of this natural selection (van't Hoff *et al.* 2016). Ford's reputation and Kettlewell's bumbling made for great story-telling, however, and by the time Hooper's book appeared neither was around to defend themselves. Many, who should have known better, leapt upon the bandwagon with glee! It was immediately adopted and promoted by the creationist movement in the USA as giving the lie to all of Darwinian evolution. Much has been written elsewhere about this volume; perhaps the most balanced account is Chapter 8 in Menno Schilthuizen's excellent book on urban evolution *Darwin Comes to Town* (Schilthuizen 2018).

The third book I have selected for special mention here is also a tale of skullduggery and drama but, perhaps, is more of a who-done-it that an exposé. In 2011 Jessica Spears, another American journalist, wrote *Winged Obsession: the Pursuit of the World's Most Notorious Butterfly Smuggler* (Fig. 6). This is a rip-roaring

tale of the pursuit of one Yoshi Kojima – described as the kingpin of butterfly smugglers – and Ed Newcomer, a US Fish and Wildlife agent. Spears is a published novelist, and this shows in this quirky non-fiction writing – lots of dialogue, plot twists and turns and a final denouement. Kojima ends up imprisoned, albeit briefly, but in fact the website he used to sell insect specimens legally and, supposedly, illegally is still up and running. Spears portrays those with insect collections (and I'm one of them) as unscrupulous obsessives. Few are allowed any redeeming features, and the entire set are damned by the illegal behaviour of a tiny minority. I note that butterfly farming and

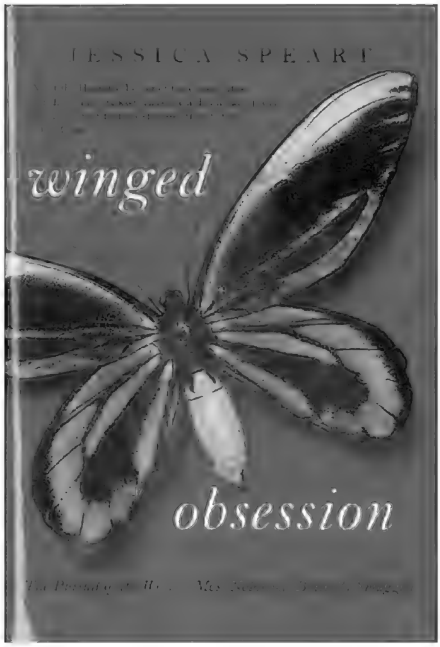

Fig. 6. *Winged Obsession*

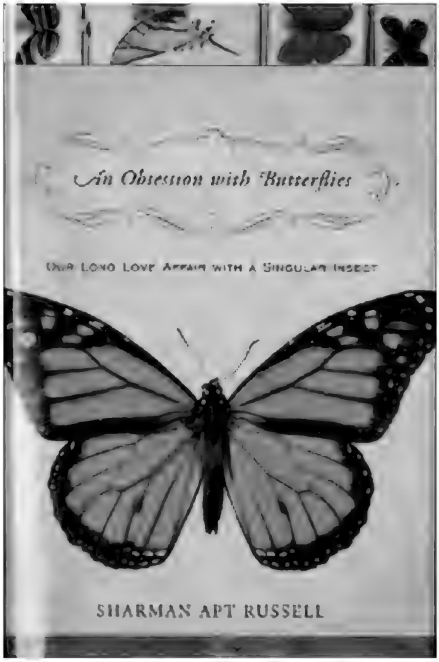

Fig. 7. *An Obsession with Butterflies*

harvesting is a redeeming cash business in some of the poorest parts of the world (including our neighbour, PNG). For what it's worth, my teenage (and subsequent) insect collecting set me on the track to becoming an entomologist, ecologist and conservationist – a career progression shared by many of my professional colleagues.

Finally, then, let us note Sharman Apt Russell's book *An Obsession with Butterflies: our Long Love Affair with a Singular Insect* (Fig. 7). This work, perhaps more than the others mentioned, glorifies entomology and entomologists. The book is, in fact, a decent introduction to many aspects of butterfly biology from reproduction to conservation. Unlike drier

tomes, however, it emphasises the lepidopterists themselves, their histories, and passions. In contrast to some works, Russell emphasises dedication and passion rather than incredulity and ridicule. She stresses the immense scientific breakthroughs that have come in no small part from the study of butterflies, from inheritance and mimicry (the work of Henry Walter Bates and others) all the way to the development of the idea of evolution by natural selection by Darwin's co-author, Alfred Russel Wallace. She is in awe of both the delicate beauty and immense variety of the butterflies, of the passion and commitment they engender in enthusiasts, and the scientific consequences arising from these passions. She has also written a very readable book.

So, these are just four contrasting examples of the *genre*. If this style of highly personal writing appeals, there is plenty more out there. Try the engaging biography of Frederick Frohawk (1861–1946), lepidopterist and ornithologist, written by my old undergraduate classmate, June Chatfield (Chatfield 1987). Alternatively delve into the 'other' life of novelist, Vladimir Nabokov, passionate lepidopterist, and specialist on the blue butterflies. This aspect of his life is the subject of at least two serious tomes which will satisfy even the most enthusiastic of his fans (Johnson & Coates 1999; Blackwell & Coates 2016). You can pursue the exciting and romantic life of Margaret Fountaine (1878–1940) avid butterfly-collector, intrepid traveller, ardent lover: an obsessive diarist, you can share her exciting life all expressed in her own words (Fountaine 1980, 1987). I could go on. Just be assured that if you are a Lepidoptera-obsessive, enthusiast, or lover, you join a wonderful, fascinating, and influential group. Eccentrics they may have been, but they shook the scientific world and beyond. Stand proud!

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A brief look at the butterflies of Sicily

Trevor A Lambkin

Introduction

Since the early 1980s I have had the opportunity to visit Sicily several times and while there have sampled butterflies, mostly on the slopes of Mt Etna and in the Nebrodi Mountains. Thus, to benefit the reader, this article provides a brief overview of these two mountain systems and their butterflies.

The island of Sicily, which lies roughly in the middle of the Mediterranean Sea, sits at the very bottom of mainland Italy, just 3 kms from the mainland at its closest point. Sicily occupies an area of 25,711 km^2, which, for comparison, is just under half the area of Tasmania at 68,401 km^2. Sicily experiences a typical 'Mediterranean Climate' characterized by relatively mild winters and very hot summers, often reaching temperatures above 40°C in coastal and inland areas. The island is very mountainous with these locations frequently visited in summer (during July and August) as a reprieve from the oppressive coastal temperatures, while in the winter months, snow sports are common. During the rest of the year, particularly from April to June, and then from September to October, temperatures throughout the island can be quite pleasant. As typical of Mediterranean climates, most of the rain in Sicily occurs during the winter months.

The northern side of the island is flanked by several mountain systems, the Madonie, Nebrodi and the Peloritani Mountains, while in the south there are several low mountain ranges, but undoubtedly, the most dominant feature of northeastern Sicily is Mt Etna, the largest active volcano in Italy (at just over 3,350 m above sea level [asl]) (Fig. 1). Regarding the island's butterflies, most of Sicily's butterfly species occur on these mountain systems. The butterflies in Sicily predominantly fly during the warmer months of the year, from as early as March up until October. Around 100 species of butterfly are known from the island, with most of these being resident. Only a few are endemic. Because of its location in the Mediterranean, butterfly diversity is relatively rich for a temperate climate, when compared, for example, to the butterfly diversity of Tasmania which is less than half of Sicily's but is twice the area. Most of the butterfly species occurring in Sicily are also found on the Italian mainland but some of the butterflies of the island have affinities to northern Africa and the Balkan Peninsula, while others are typically Mediterranean in their distribution (for example the beak butterfly, *Libythea celtis*) (Fig. 2).

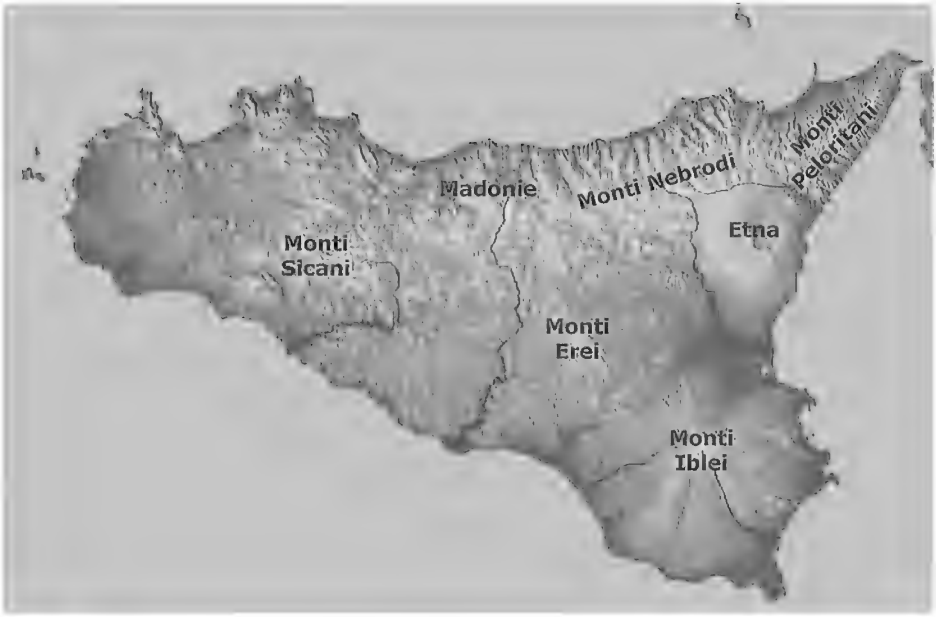

Fig. 1. Mountain ranges of Sicily

Fig. 2. *Libythea celtis* (Nymphalidae: Libytheinae)

Mt Etna

Mt Etna is unique in that, geologically, it is volcanic, and thus much younger than the rest of the island which is composed of geologically older calcareous rocks and soils. The environs of Mt Etna can be roughly divided into three ecological categories with each category relative to elevation. A cultivated, anthropogenically altered environment occurs from sea level to approximately 1000 m asl (Figs 3, 4). Above this elevation, up to 2000 m asl are naturally wooded zones, consisting of chestnuts, local native oak species and pine woods. Above 2000 m asl, pine woods continue, and higher again, the open 'desert' zone comprises thorny and prostrate steppic vegetation, above which is volcanic ash where very little grows (Fig. 5). Additionally, many lava flows of various ages crisscross the mountain (Fig. 6).

Interestingly, despite the degree of anthropogenic altered environments in the lower two zones of Mt Etna, butterfly diversity is remarkably high. This may be due to the relatively slow anthropogenic changes that have occurred on the mountain over the last 2000 years since Roman times, which has perhaps allowed flora and fauna to adapt successfully to relatively slow rates of disturbance. This is in strong contrast to the swift and destructive clearing of large areas of native forest for agriculture in countries such as Australia and the United States where ecosystems have largely been extirpated. Thus, on Mt Etna, there are currently 80 species of butterfly recorded, of which perhaps 75 are resident on the mountain.

Fig. 3. Meadow on old lava flow, Mt Etna 700 m asl

Fig. 4. Mt Etna in spring

Fig. 5. Steppic vegetation in the desert zone of Mt Etna 2200 m asl

Fig. 6. Recent lava flow, Mt Etna 1000 m asl

Nebrodi mountains

The Nebrodi mountain range is a much larger area of woodlands consisting of local native oak species and pine woods. Additionally, amongst these woodlands at higher elevations are moist flowery meadows on poorly drained calcareous soils which can be extremely rich in butterfly species (Figs 7, 8). The highest point of the range is Mt Soro at 1847 m asl. The lower slopes of the range have largely been cleared, perhaps during Roman times, but the upper slopes, i.e., above 1000 m asl have extensive areas of natural woodland. The butterfly diversity of these mountains is slightly higher than that of Mt Etna with several mainland species occurring in the Nebrodi Mountains but are absent from Mt Etna. Among these of particular interest is the Clouded Apollo (*Parnassius nebrodensis*) (Fig. 9) which can be found at the edges of deciduous forest proximal to meadows, above 900 m elevation. It flies from late May to mid-July.

Discussion

When considering the butterflies of Mt Etna, it should be noted that the mountain is almost like an island within an island because of the striking difference in its geological composition to the rest of the island. Thus, because of its rich volcanic based soils and its close links to the other two northern mountain ranges in Sicily, and to significant land masses (i.e., mainland Italy, Africa, and the Balkan Peninsula), it is not surprising that the mountain is comparatively rich in butterfly species (Table 1) despite it being only 1,190 km ^{2}.

Fig. 7. Open meadows, Mt Soro, Nebrodi Mountains 1500 m asl

Fig. 8. Flowery meadow, summer, Mt Soro, Nebrodi Mountains 1500 m asl

Fig. 9. *Parnassius nebrodensis* (Papilionidae) exhibiting conduction basking behaviour, Mt Soro, Nebrodi Mountains, 1500 m asl

Table 1. Butterfly species richness for the area of Mt Etna, Sicily

FAMILIES	MT ETNA*
Papilionidae	3
Hesperiidae	12
Pieridae	12
Nymphalidae	37
– Nymphalinae	19
– Danainae	0
– Libytheinae	1
– Satyrinae	17
Lycaenidae	16
Total number of species	**80**

* Location (approximate central co-ordinates): 37.74°N 15.00°E.

In summary, Sicily's two mountain systems of Mt Etna and the Nebrodi Mountains account for around 95% of the butterflies known from the island. As with all mountainous regions, some areas of mountain ranges in Sicily are remote, and thus new butterfly distribution records for these mountains are possible.

More of the butterflies of Sicily are illustrated in Figs 10–15, and for the benefit of those interested in mistletoes, Fig. 16 illustrates a common European montane mistletoe growing on Mt Etna.

Fig. 10. *Lycaena phlaeas* (Lycaenidae)

Fig. 11. *Polyommatus celinus* (Lycaenidae)

Fig. 12. *Aglais urticae* (Nymphalidae)

Fig. 13. *Melitaea nevadensis* (Nymphalidae)

Fig. 14. *Boloria euphrosyne* (Nymphalidae)

Fig. 15. *Pararge aegeria* (Nymphalidae: Satyrinae)

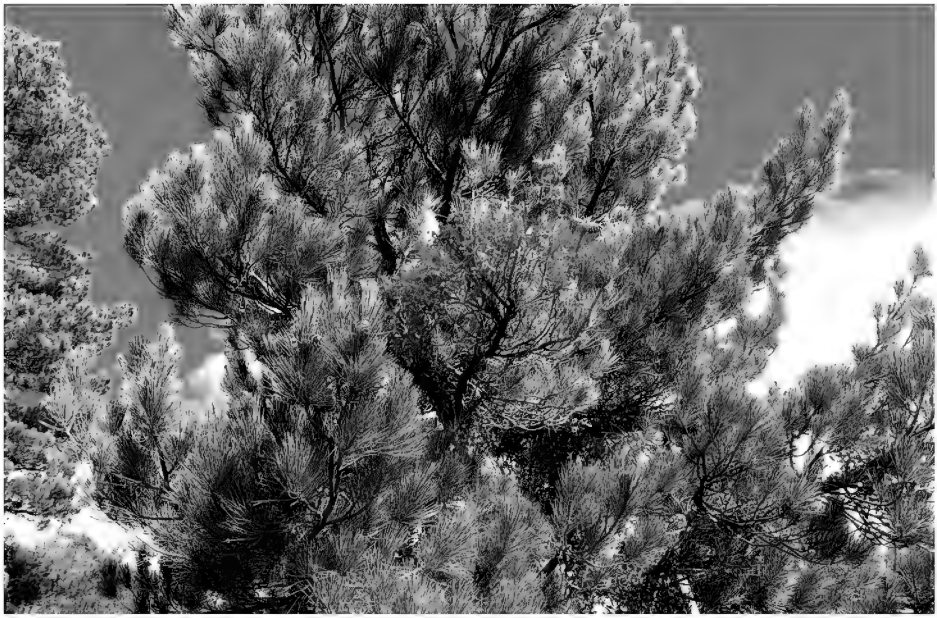

Fig. 16. *Viscum album austriacum* (Loranthaceae) parasitising pine, Mt Etna 1750 m asl

A record of *Acrodipsas illidgei* (Waterhouse and Lyell) (Lepidoptera: Lycaenidae) from Karawatha Forest Park, Brisbane

Amelia Westerman and Trevor A Lambkin

The Mangrove Ant-blue, *Acrodipsas illidgei* (Waterhouse and Lyell) is an endemic Australian butterfly restricted to eastern Australia, from the Mary River near Maryborough, Queensland to Brunswick Heads, New South Wales. The species is considered vulnerable in Queensland. Typically, the butterfly is restricted to old growth mangroves dominated by the Grey Mangrove (*Avicennia marina*) (Braby 2016). Within this habitat, the butterfly breeds in dead branches and stems of the mangroves where the larvae are carnivorous on larvae and pupae of a *Crematogaster* ant which inhabits the dead limbs of the mangrove. Until now, just a single female specimen is known from outside of mangroves from Toowoomba in open eucalypt woodland (Lane 1991). Braby (2016) recorded another specimen from the Darling Downs, but this specimen was misidentified and was found to be another species of *Acrodipsas* (M.F. Braby pers comm.).

At 3.37 pm on the 11 August 2023, one of us (AW), while nature journalling just outside the Forest Discovery Centre at the Karawatha Forest Park, Brisbane, spotted a small lycaenid butterfly perched on a leaf of a paper daisy in the pollinator garden section. Several photographs of the butterfly were taken and posted on the Butterfly and Other Invertebrates Club's Facebook page.

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Based on these images, the butterfly was confirmed to be a female specimen of *A. illidgei*, only the second specimen known from outside of mangroves. The specimen was found to have deformed wings and for this reason, it was sitting motionless on the paper daisy very close to the ground (Figs 1–3). If not for the specimen having deformed wings, it would never have been seen.

This is a very significant record, and it begs the question, how widespread is this species in open woodland and because the butterfly and perhaps its ant are arboreal, is this butterfly species much more widely distributed and more common than what records indicate? This record and the record of Lane (1991) would indicate that perhaps a more appropriate common name for the butterfly should revert to Illidge's Ant-blue rather than the Mangrove Ant-Blue.

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The Purple Copper Butterfly, *Paralucia spinifera:* a rare and threatened species in New South Wales

Christine Bailey

Introduction

Perhaps your expectation of this article should not be for highly technical details of this butterfly, but rather for an interest and wonder at the amazing symbiotic relationship between a tiny butterfly and an even tinier ant.

My own sense of intrigue began with a local environmental crisis which needed investigation as to its impact on habitat. While investigating, I learnt about the Purple Copper, a local species, vulnerable due to land clearing, weed infestation, climate change and feral pigs.

This led me to a lengthy process of writing and illustrating the Purple Copper's lifecycle. Finally, the book, "The Purple Copper's Secret", emerged somewhat like the butterfly itself, vastly changed from the original verse form to a narrative with scientific annotations (Fig. 1).

Fig. 1. Cover of the book *The Purple Copper's Secret*

The book is intended for all ages. An adult launch and two children's workshops have been held so far.

All groups were extremely interested, but I was particularly impressed by the children's attention and enthusiasm. Their insightful questions and thoughtful comments demonstrated engagement with the story and a developing understanding of a life they previously knew nothing about.

- "Why don't the mummy butterflies look after their babies?" asked one alert seven-year-old.

Others asked:

- "Do the same ants look after the same caterpillars all the time?"
- "Why don't the big insects bite the ants?"
- "I think the ants getting the reward for looking after the caterpillars is like me getting pocket money for helping with jobs at home."
- The older children delighted in learning and saying: *mutualistic symbiosis.*

The story and discussion were followed up with expressing the Purple Copper's life in paint and clay, and with music and movement.

This brings us to the astounding story itself. The following account is a blend of story – including some examples of the book's illustrations which were designed to capture children's imagination – and scientific information and photos.

Life history of the Purple Copper: P. spinifera

The known habitats of the butterfly are scattered and isolated patches in the Central Tablelands of New South Wales and a recently discovered site in Namadgi National Park in the Australian Capital Territory (Figs 2, 3).

Climate is a critical element in the Purple Copper's survival. Winter frosts and occasional snow are necessary for successful pupation while frequent days with a few hours of direct spring sunshine encourage the butterfly's flight, sun basking and mating. Summers can be hot. Rainfall averages about 900 mm per annum over the region.

The spiky, spindly *Bursaria spinosa* ssp. *lasiophylla,* is the only food plant on which *P. spinifera* larvae will feed (Fig. 4).

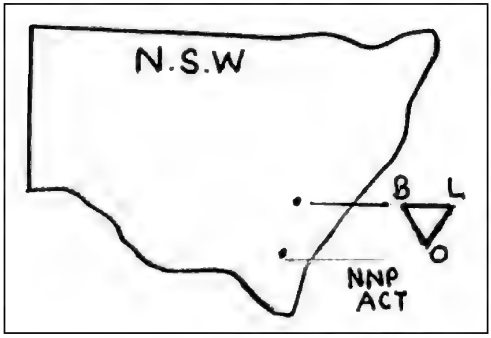

Fig. 2. Map locating *Paralucia spinifera* in NSW

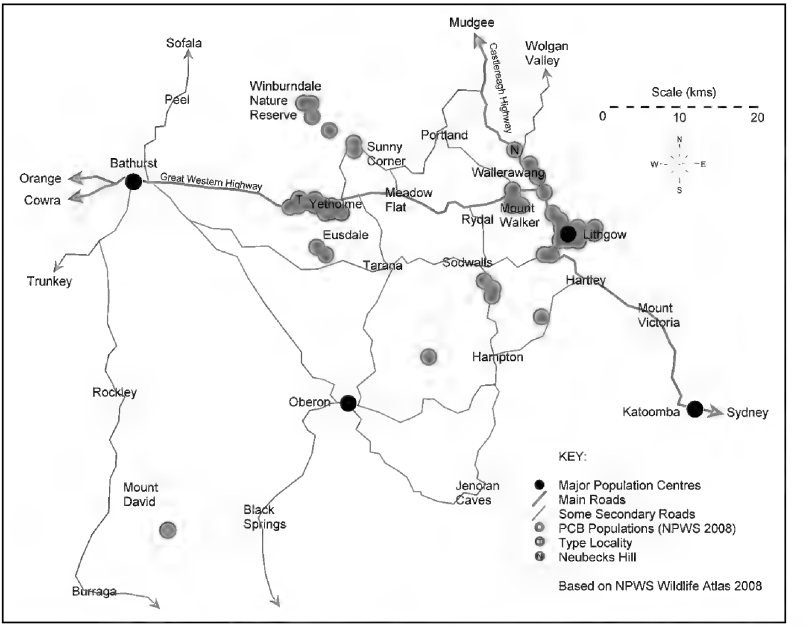

Fig. 3. Purple Copper Butterfly Sites

Fig. 4. Young plant of *Bursaria spinosa lasiophylla*

Although this plant also grows at lower elevations, the butterfly is only associated with plants growing above 850 m, in open eucalypt woodland with clay soils.

In the Central Tablelands of New South Wales, it occurs in remnant patches of woodland, along roadside verges, old travelling stock reserves and other crown lands. Several sites are located on private properties (Fig. 5).

Young foliage of *Bursaria* (Fig. 6) is preferred by the larvae of the butterfly as the new, tender leaves are close to the ground, and the stem and branches as yet are unaffected by lichen. Lichen can make travel for the larvae difficult or impossible.

Eggs are laid singly or in groups of up to four, on or under these leaves by the female butterflies in spring. The eggs are pale green, turning whitish, hemispherical, with a pitted and spiked surface, less than 1 mm long and less than 0.5 mm high.

Ants (2.5 mm long) of the species *Anonychomyrma itinerans* are 'in attendance' immediately. 'In attendance' seems to mean close watching till larval hatching, then continued surveillance until after the third instar (moulting). At this stage, the larvae are moved by the ants down into their nest beneath the bush. There the larvae remain during daylight hours, perhaps to prevent possible predation by birds (Fig. 7). At night, the ants encourage the larvae to crawl up the stem of the *Bursaria* to feed on the leaves. The ants continue in attendance (Fig. 8). However, dangers also exist at night in the form of predatory insects such as wasps and praying mantises, or arachnids such as spiders.

Fig. 5. Typical habitat

Fig. 6. *Bursaria spinosa lasiophylla*

Fig. 7. Ant nest

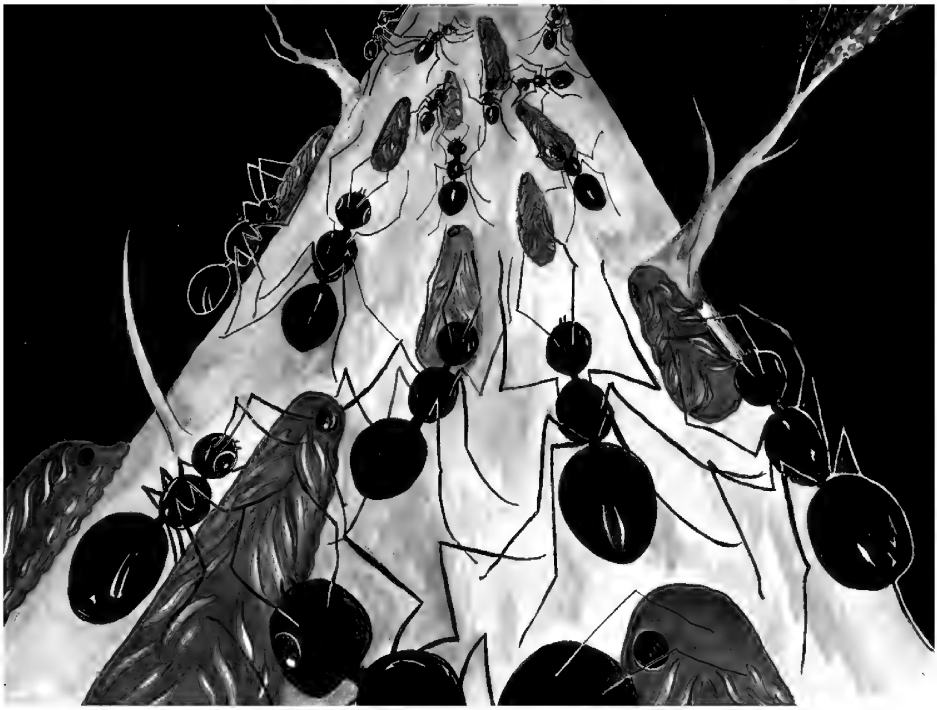

Fig. 8. Larvae and ants move upwards

Up to twenty ants or more swarm over each larva, fighting off any attackers (Fig. 9). Ants also patrol a line between the nest and the stem and branches.

However not every defence tactic is successful — sometimes the predator wins (Fig. 10).

Before dawn, the larvae are shepherded back to the underground nest by the ants (Figs 11,12).

The big, important question is: "Why do the ants seem so caring and kind?" Is this altruism, or is something else involved?

Indeed, yes! On each larva's back, on the 3rd last segment, there is a nectar-producing gland. This honey dew is the ant's delight, a nutritious and delicious reward for their constant protection. This is mutualistic symbiosis. It is obligate on the part of the larvae, and facultative on the part of the ants. This means the larvae cannot survive without the ants, but that the ants can and do survive without the larvae, but it is a distinct benefit for the ants to attend the larvae (Fig. 13).

By the height of summer, the larvae stop eating the leaves and are ready to pupate. They have grown from 1.5 mm at hatching to about 14 mm at the final instar.

Fig. 9. Ants protecting larva

Fig. 10. Larva captured by Wolf spider

Fig. 11. Time to return to the nest

Fig. 12. Ants shepherd larvae back to nest

Fig. 13. Honey dew reward

Pupation takes place in loose soil in the ants' nest. This pupal stage lasts approximately 7 months i.e., the rest of summer, autumn, and winter. To keep the ants from abandoning them, pupae will occasionally stridulate (make clicking sounds). Like all butterflies and moths in pupation, the Purple Copper undergoes metamorphosis, an astounding and complete transformation (Fig. 14).

In early spring the pupal skins split, and crumpled-wing butterflies emerge. They make their way out of the ants' nest towards sunlight. Resting on stalks, and hanging so their wings won't be deformed, the butterflies will flap to strengthen and dry their wings, this pumping action sending fluid through the wings' veins. It may take a couple of hours or more, for the wings to harden enough for flight (Fig. 15).

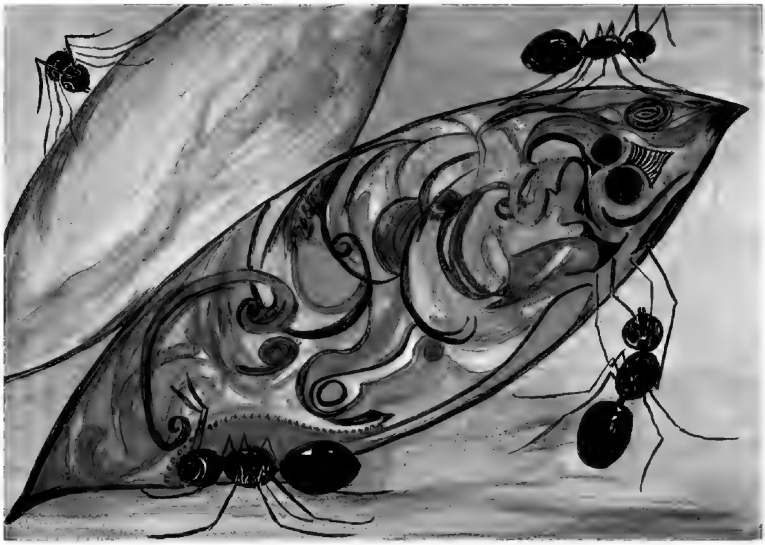

Fig. 14. Illustrated metamorphosis

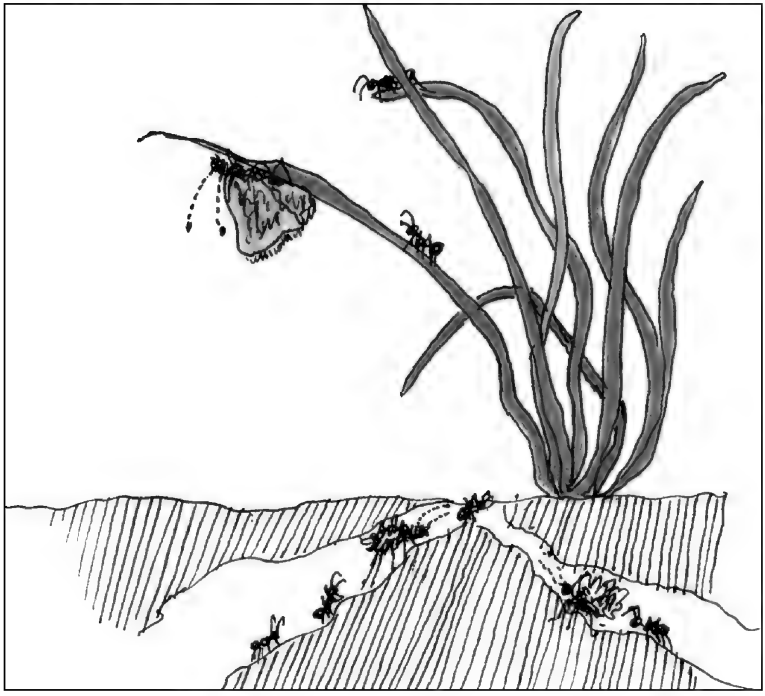

Fig. 15. Emerged and drying wings

The butterflies do not fly high nor far from the *Bursaria* unless pairs are performing spiralling dances or male rivals are attacking. At some point in these acrobatics, pairs land on a stalk and mate (Fig. 16).

The full iridescence of their wings is displayed when they alight in an open spot to bask and orientate their wings to the sun. Each minute flutter can create colour-shifts from deep brown, through purple, turquoise and blue, copper and bronze, to emerald, orange and yellow. The strength of light, angles and perspective of the viewer all influence this jewel-like spectacle (Fig. 17)

Spring sunshine on calm days provides the best chance of viewing these butterflies. On rainy, cloudy, or very windy days, observing the butterflies is near impossible: their stillness and closed cryptic underwings effectively disguise their presence (Fig. 16). The butterflies within any *Bursaria* patch may only live for 2 or 3 weeks maximum. This short time span is enough for mating and egg-laying to occur before the end of one lifecycle. But the ants remain, watching and waiting … and so the cycle begins again (Fig. 18).

Fire seems a necessary component of ensuring the viability of the butterfly's habitat. It encourages the essential new growth and rids the area of strangling undergrowth, weeds, and treacherous lichen (Fig. 19).

Fig. 16. *Paralucia spinifera* mating

Fig. 17. *Paralucia spinifera* male upperside

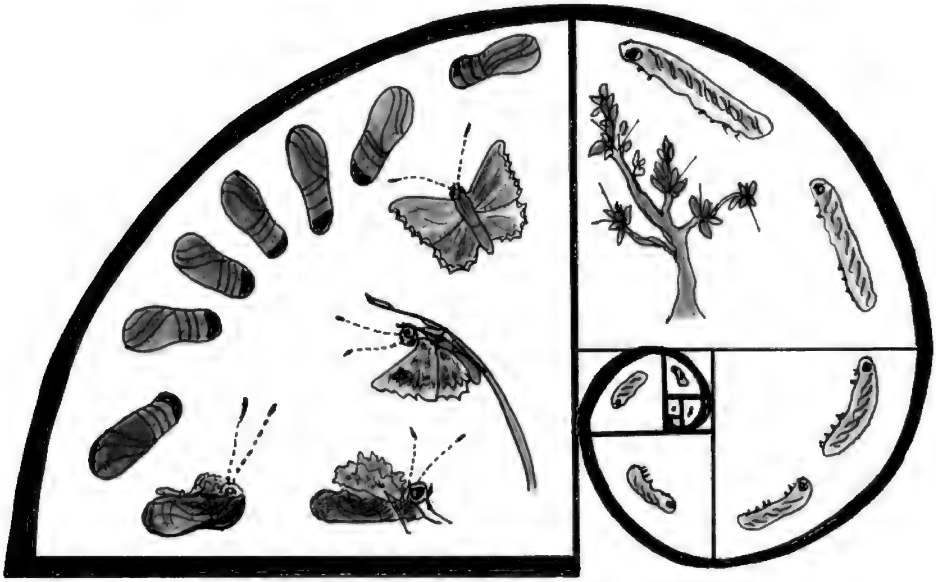

Fig. 18. The lifecycle

Fig. 19. Fire-encouraging new growth

Counting and recording caterpillars at night in summer and butterflies on sunny days in spring are part of the Local Land Services and Save Our Species programs to monitor sites. Planting habitat and weeding are also essential elements in maintaining the butterfly sites. Citizen scientist volunteers participate enthusiastically in these projects (Figs 20–22).

Education of the community is key to conservation of this species, and indeed all species (Fig. 23).

"In looking after one species, all other species in the habitat benefit," says Ray Mjadwesch, biologist/ecologist who has been doing just that for nearly 30 years.

Acknowledgements

The author gratefully acknowledges the photographic contributions of Gerarda Mader (Figs 6, 12, 19, 20); Ray Mjadwesch (Figs 3, 5, 9, 10, 13, 16, 17); Allan Wray (Figs 21, 23); Josie Stokes (Fig. 11); and thanks Ray Mjadwesch and Allan Wray (Senior Land Services Officer) for their expertise and information about their practical experiences in the field: of observation, surveying, monitoring; and protection and maintenance of the Purple Copper and its habitat. A big thank you also to my husband, Brian, for his digital expertise in enabling photo and image transfer, and my brother, Alan Hyman, for assistance with textual integrity.

Fig. 20. Counting caterpillars at night

Fig. 21. Counting caterpillars in spring

Fig. 22. Planting habitat

Fig. 23. Community education

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Mistletoes of Western Australia by Tony Start and Kevin Thiele

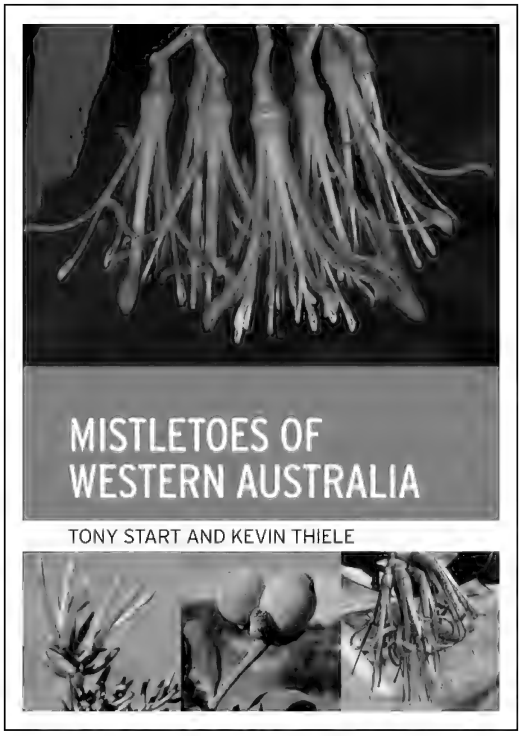
CSIRO Publishing

Reviewed by Peter Vaughan

We have two other excellent books on mistletoes, covering the Eastern states up to Southern Queensland, so apart from geography, how is this book different?

Tony Start is an ecologist. He has been studying mistletoes for 40+ years, and the first 42 pages presents his knowledge on the ecology of mistletoes. Plus, in the species discussions, specific details of the ecology of individual species are recorded. There is interesting information that is not available in any other publication. Kevin Thiele is a taxonomist, so we are presented with clear, simple to use, taxonomic keys and plant descriptions.

Also, don't let geography deter you, Western Australia (WA) has many mistletoe species that extend into the Northern Territory and tropical Queensland. Until we get a mistletoe book to specifically cover this region, this is a valuable reference. In fact, WA has many species that extend to all mainland states.



Overall, *Mistletoes of Western Australia* describes:

42 species from Western Australia, of which 28 species are also found in the Northern Territory, 16 species also occur in South Australia, 15 species in NSW, and 6 species in Victoria. Thus, this book is presenting new information on mistletoe species that grow Australia wide.

To me, the major strength of this book is the information on ecology, providing me a better understanding of mistletoes, and at the same time it explains shortcomings in our knowledge, opening the way for citizen scientists to contribute.

Some may be disappointed by the lack of information on the relationships between butterflies and specific mistletoe species. I suspect most of this information has yet to be discovered. So, come on citizen scientists.

The coverage of mimicry between mistletoes and hosts is quite interesting. However, there are other theories of equal validity that are not presented. I also wonder why scientists do not see possums as major feeders of mistletoes. I have been growing mistletoes for many decades and some species need possum guards for success. So, possums feeding on clearly varies between species and geography. Yet another opening for citizen scientists.

Overall, an excellent book, providing lots of new information on a very important group of plants. This book is a paperback edition consisting of 152 pages.

Where are All the Christmas Beetles? by Suzanne Houghton

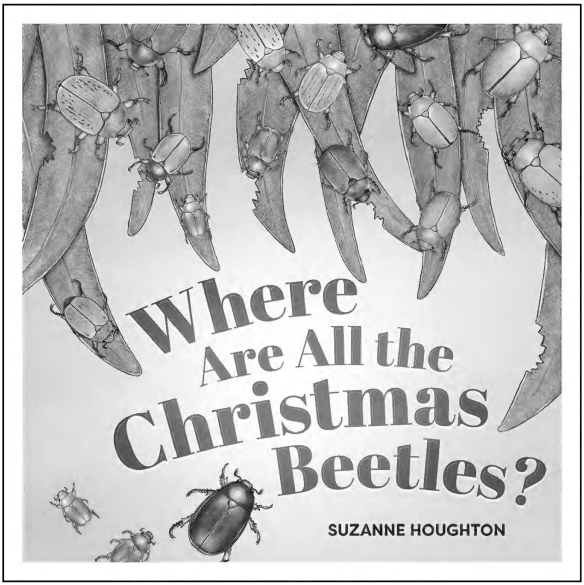
CSIRO Publishing

Reviewed by Judy Ferrier

Books are an ideal addition to fill children's stockings and what better choice than the latest CSIRO publication entitled "Where are All the Christmas Beetles?" The illustrations in this book are truly superb and would appeal to young eyes. Suzanne Houghton uses colour effectively and includes familiar backdrops that young readers can identify with readily.

Using simple, minimal verse, she poses the question of the increasing disappearance of the Christmas beetle (*Anoplognathus*) from our suburban gardens. Suggestions are made as to where to hunt them out, explanations of how they grow, and possible causes offered for their diminishing numbers. Children are guided through this information in a subtle but effective manner as the author unfolds the mystery of the disappearance of these charming beetles with their shiny exoskeletons.

The book includes a glossary of scientific terms. This is a good lesson in vocabulary enrichment and also trains the young reader to seek out such appendices to further their understanding of their reading. Also, the expanded notes at the closure of the book offer a more formal and comprehensive account of this topic and this well serves the older child, seeking more detail and depth on the topic.



The Girl who Loves Bugs by Lily Murray and Jenny Lovlie

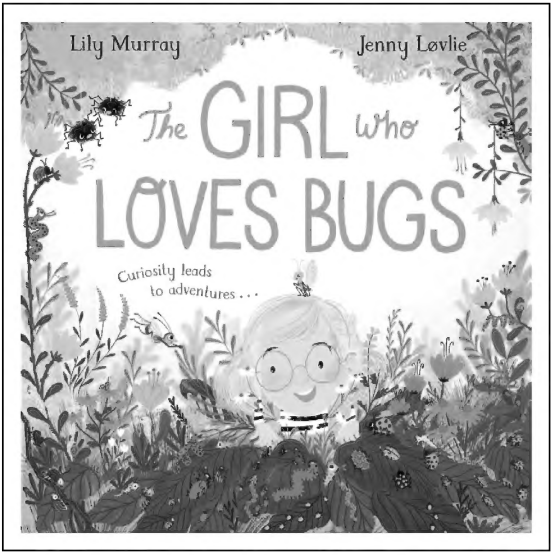
MacMillan Children's Books 2023

Reviewed by Judy Ferrier

A recent publication, "The Girl who Loves Bugs" (Lily Murray and Jenny Lovlie, 2023) has a global setting and would suit a younger audience. This book highlights the wonder that youngsters experience when they engage with the natural world. This is something that we, as adults who enjoy such environments too, should foster in our children especially at a very early age.

The book centres around Evie and her passion for observing and collecting insects, although spiders and other small creatures feature in her fascination too. The book has been inspired by Evelyn Cheesman (hence probably "Evie" being the name of our heroine) who was a well-respected insect enthusiast at the turn of the last century when such activities were uncommon for English ladies.

The verse in this book is both witty and humorous and the storyline, delightful. The book celebrates that through curiosity little people can learn so much and revel in the joy of discovery. Hopefully it may act as a springboard for them to look closely in their gardens and see a world of teeming life at their feet and in the air about them. They may even be inspired to build a "bug hotel" and create a "zoo for mini beasts" from the suggestions at the end of the book. This book would also be a delightful addition to a child's Christmas stocking.



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